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PREFACE.

AMIDST the troubles occasioned by the horrors of war, which have interrupted or destroyed most of the Societies established in various parts of the Continent of Europe for the promotion of useful inventions, the Society instituted at London for the Encouragement of Arts, Manufactures, and Commerce, still continues to flourish and to extend its beneficial influence throughout the habitable world.

The present Volume of their Transactions will evince the unremitting attention paid by the Members of this Society to the great objects of their Institution, and the numerous valuable Engravings, with which this volume is enriched, will prove that the Society is not sparing of expense in elucidating the subjects of its rewards.

The Society ever solicitous to express its gratitude to such of its distinguished Members as have honored it with their more immediate patronage by filling its highest offices, have, with the permission of his Grace the present Duke of Portland,

land, caused an elegant and correct likeness of the late Duke of Portland, engraved from a painting by Sir Joshua Reynolds, to be prefixed to this Volume. He was forty-seven years a contributing Member of five Guineas a-year to the Society, and was elected to the office of Vice President in March 1794. His Grace died on the 30th of October, in the seventy-second year of his age.

Agriculture in all civilized states naturally demands every possible encouragement, and no session of the Society has yet elapsed without its rewards and bounties having called forth the exertions of many patriotic and ingenious individuals in the different departments connected with that most important branch of public welfare.

The great labor and expense attendant upon the thrashing of corn and grain by the hand, have occasioned many experiments to be made for the execution of that work by machinery, and various machines have been constructed for such purpose, over all of which, however, from the very respectable testimonies adduced, it appears that the Thrashing-Machine, invented by H. P. Lee, Esq. of Maidenhead Thicket, lately rewarded, possesses great advantages, as well from its simplicity of construction, and the ease with which it can be worked by two horses, as from its cheapness, and the facility with which the operation is performed by it.

Thomas Johnes, Esq. of Hafod, in Cardiganshire, has lately added 300,000 larch trees, 30,000 beech, and 10,000 spruce firs, to his former extensive plantations. This gentleman, as an agriculturist, may be considered the greatest benefactor, both by precept and example, that part of the country has ever known. Before he sowed wheat in Wales a rooted prejudice had obtained, that it could not grow there; but under his fostering influence, an immense extent of land, heretofore regarded as barren, has produced flourishing crops of that and other species of corn. To ascertain the growth and increase of the girths of timber at certain periods is very desirable, and it is particularly wished by the Society that gentlemen who have planted many trees, would furnish communications similar to those of Mr. Johnes on this subject.

John Christian Curwen, Esq. of Workington, in Cumberland, ranks high as a patron of agriculture in all its branches: a detail is given in the present volume of his accurate Experiments on the different Breeds of Cows, with a view to ascertain the particular breed which can be best fed at the least expense. It is a favourite idea with Mr. Curwen, that the riches and power of a nation depend principally upon agriculture; and he appears to have verified this opinion by the wonderful advantages which he has produced in the county of Cumberland. As a practical farmer he has grown, upon an estate held in his possession, upwards of £. 6000 worth of corn in one year; and has furnished to the poor, within the same period, from his own cows, more than 17,410 quarts of milk, and sold the new milk at 2*d*. per quart, and skim milk at 1*d*. wine measure; and as a planter he has planted more than 1,000,000 of timber trees in the course of twelve months.

The value of Pinaster Fir Trees, as Timber seems hitherto to have passed almost unregarded: a very interesting communication will be found from J. Berney Petre, Esq. of Norfolk, on this subject. From his account and specimen produced it appears that this wood is much more deserving of notice than it has ever yet obtained; and when the beauty of its foliage, its rapid growth, and the peculiar property it possesses of flourishing on poor lands near the sea-coast, are considered, it will naturally claim, and amply repay public attention. Mr. Petre's establishment of a Chamomile Ground, which furnishes employment to the poor, and a most valuable article to our *Materia Medica*, is too important a circumstance to pass without commendation.

It has been generally remarked, that the sea which environs our island makes frequently great encroachments on many parts of our coast; it is pleasing, however, to ascertain, that by the joint exertions of Mr. Stockdale and Mr. Towers, upwards of five hundred and sixty-four acres of land have been rescued from its ravages; and the means by which the object was effected are accurately described, and will enable proprietors of land on the sea-coast to preserve and even to extend their possessions.

Improvements in the Construction of the Plough, that implement of primary importance in agriculture, have much occupied the minds both of theoretical and practical agriculturists. We observe some difference in the form and construction of the ploughs of almost every county, owing to the variety of soils, pecularity of situation, or some accidental circumstances or prejudices. The plough invented by Mr. Thomas Balls, of Saxlingham, possesses the double advantages of a Wheel, and Swing Plough, and of cutting the furrow of any particular depth which the farmer may desire, even when he is not personally present, after he has once fixed it for use.

The mischief arising from the luxuriant Growth of Docks and Thistles, on land of every description, it is hoped, will be in a great degree prevented by the ingenious implement invented by Mr. J. Baker.

Mr. William Jeffery has invented a very ingenious contrivance of expanding Harrows, which are so formed as to open or contract as the nature of the land may require. From respectable Certificates, it appears that these Harrows may be advantageously used on all kinds of land, from the most stubborn soils to the finest tilth; and when not in use may be conveniently folded up and preserved.

Much has been advanced by different agriculturists, respecting the comparative merits of the Reaping Hook and the Sickle, in cutting corn, and a considerable quantity of grain is annually wasted from the defect of the instruments, or their mismanagement. A Reaping Hook lately contrived by Mr. Joseph Hutton, Jun. appears to possess the joint advantages of the two implements.

Under the Class of Chemistry it will be seen, that this Society, attentive to the policy which they have ever had in view of supplying our wants or embellishments, with the products of our own kingdom, or those of the United Empire, have, in the article of Marble, endeavoured to prevent the apparent necessity of sending large sums of money annually from hence for the purchase of foreign marble; and the various specimens of beautiful marbles produced from quarries in England, Scotland and Ireland, by Mr. Hubbard, (as in our last Volume), and by the exertions of Mr. Jopling, the Dublin Society, and Alexander Mitchell, Esq. (as recorded in the present), ascertain the great success of their endeavours.

The heat, light, and products from Pit Coal, have for a few years past engaged much of the public notice. Few persons seem to have paid such minute attention to the subject as Mr. B. Cook, of Birmingham, who has furnished the Society with specimens of Asphaltum, and substitutes for Oil of Turpentine, also specimens of Varnish prepared from these articles, forming Japanned Work of a superior stile of excellence; and has given a minute account of the methods he has employed in procuring from Pit Coal these products.

The great difficulty which lately occurred of obtaining Turpentine from America, and the high price to which this article had risen, stimulated the active and patriotic mind of Mr. H. B. Way, of Bridport Harbour, to endeavour to procure it in England from Firs of British growth; the Society have received from him specimens procured from them in the manner of that collected in America, along with many excellent remarks on the subject, which, it is hoped, will call forth the attention of persons possessed of large fir-plantations, and induce them to make extensive exertions in this line, for their own emolument and the public benefit.

The Rewards bestowed this Session, under the Class of Polite Arts, will probably create a spirit of emulation in the minds of those young artists to whom they have been given. Many artists, deservedly of high reputation in this country, arose to fortune and to fame from the spark of genius kindled in their breasts in their youthful days, by the applause of this Society. Amongst other important duties,

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the Society have directed their attention to the improvement of female accomplishments, and afford to the Fair Sex pleasing and elegant amusements.

The easy and expeditious improvement in the Aquatinta Process, for which Mr. Hassell has been rewarded, possesses many advantages which would have appeared in a much more favourable point of view, and probably tended much to his emolument, if Mr. Hassell could have been prevailed upon to have elucidated his method by an explanatory sketch in this Volume.

The preparation of Ox Gall, for the use of painters, by Mr. Cathery, will be found useful, and prevent the noxious effects which have frequently arisen from the use of gall in a putrid state. In some cases it will also be found an article of economy for employment in manufactures.

Under the Class of Manufactures are inserted many interesting experiments by Mr. E. Smith, of Brentwood, Essex, upon the Fibres of the common Nettle. He has proved that this plant readily furnishes substitutes for hemp, flax, linen, tow and cotton; and that the thread made from Nettle-fibres possesses properties equal to those of the best flax. An instructive lesson is thus conveyed of the bounty of Providence, in furnishing, from a neglected weed, such valuable products.

By J. Sholl's improvement in the art of weaving Figured Silks, the work can be better executed, and with less time and expense, as may be seen from the numerous Certificates in its favor.

The beautiful Figured Napkin, executed by Mr. Lockett, is superior in design, and equal in quality to the best German figured linens which have been generally held in high estimation, and imported into this country at a great expense.

By Mr. Corston's communication, it very satisfactorily appears, that the Gold Medal of the Society conferred upon him in the year 1805, has promoted the desired object of effectually establishing the Manufacture of Leghorn Plait in this kingdom, and of affording employment very extensively to young children and the superannuated poor of both sexes.

The Class of Mechanics exhibits a very great number of useful inventions, produced this Session to the public. In the Rev. J. Bremner's communication of his method of making any Ship's Boat a Life Boat, to preserve the crew from imminent danger, we consider with pleasure the philanthropy of his heart, which induced him, with so small a portion of worldly means, to undertake so arduous a task; we contemplate, with surprize, the perseverance and unremitted attention which he exerted in effecting the object; and

and we admire the ingenuity, efficacy, and simplicity of the means by which he has effected it. In the hour of distress and danger the blessings of many an unfortunate person, rescued from a watery grave, will attend his efforts in the cause of humanity.

The improved Mooring Block for Ships, invented by Mr. Hemman, is of great importance; both in giving greater security to our ships, and procuring that security by a method much less expensive, and with greater certainty than by the modes heretofore adopted.

The combination of Portable Ladders invented by Mr. Davis, to preserve persons and property from fire, and which is easily conveyed and applied, will, it is hoped, prevent the recurrence of many affecting accidents which have lately happened, of persons perishing by fire, in their chambers, for want of proper and timely assistance. This apparatus demands the attention of every parish, from the advantages it possesses of portability, certainty in application, and the security which it affords to the weak and infirm.

To a nation like our's, dependant upon commerce, the improvement of Nautical Instruments will ever be a primary consideration; by means of the Mathematical Dividing

Wheel, produced by Mr. J. Allan, the instruments used in navigation will be formed with more accuracy and at less expense than formerly, and the scales of mathematical instruments in general be made more correct.

The Tachometer, or Apparatus invented by Mr. B. Donkin, for ascertaining the velocity of Machines of various descriptions, shows by simple inspection, when once regulated, whether their motions are proper, or whether they are irregular, quicker, or slower than what is desired.

In many extensive manufactories motion is communicated to the machinery by means of leathern straps, and it is therefore of importance that their breadths and thicknesses should be correct and uniform when so applied; to effect which the Instruments lately invented by Mr. L. Aubrey will be found very competent.

The use of cocks for drawing-off liquors of every description is well known, and it is of consequence to have them accurately formed. Mr. E. Williams's Machine for boring them is very ingenious and effectual.

Mr. E. Baker has lately made great improvements in Fire-Arms, particularly in Pistols, which he has rendered more safe to the bearer, and more effectual in use than those formerly

formerly employed by the cavalry; and we find that these improvements have met with the sanction and approbation of persons of great experience.

The process of separating iron-filings from their admixture with those of other metals is in the common way a very tedious operation, but upon the principle practised by Mr. Ross is easily effected.

Shocking accidents have frequently occurred to painters and glaziers employed on the outside of windows, or to persons who clean them; a Sash, lately invented by Mr. G. Marshall, will be free from such dangers, as upon this principle both the top and bottom sash-sheets will admit of their outsides being easily turned within the room, to clean or repair, and their motions of lifting up and down in the usual way at the same time preserved.

Pure water is always desirable; by Mr. W. Moult's application of the Filtering-Stone, in such a manner as to allow water to pass through it from without, instead of the water being poured into it to filter in the common way, it is shown by the Certificates of several respectable Gentlemen, that the water will be more pure, and furnished in larger quantities, and the stone continue longer clean, than when dripped through, as by the common filtering-stone.

The eye is frequently struck and the mind shocked with the view of a poor horse thrown down upon the pavement in the public streets in the shafts of a loaded cart; and struggling in agonies beneath it; Mr. B. Smith has invented a very simple and easy Method of raising the cart, and relieving a horse from such a miserable situation.

Great danger has arisen, and many lives been actually lost from foul air of different kinds remaining stagnant in mines; Mr. J. Taylor has contrived an easy Method of extracting the Foul Air at the distance of more than a thousand yards from the place where the apparatus is fixed, and of supplying the miners with Fresh Air upon a cheap plan, applicable to the purpose also of ventilating ships and hospitals.

Mr. Adam Reid has invented a Compensation Pendulum for a Clock, made by adjustments of zinc and steel, so as to counteract its dilatation by heat or contraction by cold, and thus procure a regular motion of the pendulum, and make the clock keep true time.

An ingenious contrivance for knowing the hour in the dark, by a cheap apparatus in which a common watch is placed, has been produced by Mr. George Spark, and termed by him a Noctuary.

The infirmities of the human body are more diversified, and operate to a greater extent than are generally known or conceived. To alleviate the many diseases and accidents to which the human frame is liable, the Society have, in several instances, extended their vigilance during the present session, as the following statements will evince.

Mr. J. Whitford has been rewarded for an ingenious Truss for Inguinal Ruptures, which adapts itself to the particular form of the body, to fit close and firm.

A Silver Medal has been given to Mr. G. Prisley, for his construction of Spring-Crutches for Invalids, which assist them to walk with greater certainty, safety and ease.

A very extraordinary instance of the efforts of human genius to remedy one of the most serious misfortunes in life has been exemplified by the exertions of Mr. J. Morison, who unfortunately lost both his hands and part of his arms in firing off a cannon on the King's birth-day. Great acuteness of mind and firmness of character have enabled him to overcome difficulties which might naturally have been supposed insurmountable, and he has not only been the means of procuring many comforts to himself by his ingenious inventions for supplying the want of hands and arms, but of establishing a business by which he has the power

power of contributing greatly to the happiness of others who have met with similar accidents. The following honorable Certificate, in favor of Mr. Morison, which was received too late for insertion in the body of the Volume, is of too much consequence to neglect notice here, or to require an apology for its introduction.

Chelsea Hospital, Feb. 5, 1811.

" We certify, that we have examined the instruments that have been submitted to our inspection, and which, as we are informed, were invented by John Morison for supplying the loss of both hands and arms; that we approve of the same, and recommend him as a person who deserves encouragement.

" T. KEATE, WILLIAM BLIZARD,
" G. CHANDLER, WILLIAM NORRIS,
" H. CLINE, Jun. JAMES WARE."

The Class of Colonies and Trade exhibits pleasing accounts of improvements of great consequence to our trade and commerce, and of the resources which may be derived from our colonies, both in the East and West Indies.

The manufacture of Nerium Indigo, fully detailed by Dr. William Roxburgh, exhibits many curious circumstances attending the process, a consideration of which will be very important to dyers of silk, cotton and linen. So short a period back as the year 1788, the quantity of Indigo imported from the East Indies was very small in comparison with the immense quantities we then procured from Spain and France. The rapid increase of its manufacture in the East Indies arose from a memorial delivered to the late Right Hon. William Pitt by our present Secretary, which called that Minister's attention to the importance of the subject, and was printed and circulated in India by order of the Right Hon. the Lords of the Committee of the Privy Council for Trade and Plantations.

To Dr. Roxburgh the public are greatly indebted for many valuable discoveries. The Swietania Fever Bark; the cheap substitute for pitch and tar; the articles now recommended by him for tanning; and his additions to our *Materia Medica*, are well deserving of attention and extensive experiment.

Dr. Anderson, of the Royal Botanical Garden at St. Vincent, has, with his usual assiduity attended to every advantage he could possibly procure there for the interest of our West India colonies, and that of this country.

From him has been received the confirmation of the great success of the method, recommended by Mr. Salisbury in the 27th Volume of Transactions, for preserving in packages of the Moss, called Sphagnum Palustre, various plants and trees when exported to foreign countries.

The Society have not recorded any of their communications from Canada, as they contain only general, but at the same very satisfactory accounts of the flourishing state of those Provinces, and of the great quantities of timber (similar to that formerly supplied from the Baltic,) now constantly arriving from Canada, equally to the substantial benefit of the mother country and to the disappointment of her enemies.

The present Volume has been longer delayed in publishing than could be wished, owing to the Engravings it contains, which are much more numerous than in any former Volume, and which have required more time to execute; the Society being always anxious to convey to the public, in a clear and explicit manner, the subjects they communicate.

The acknowledgments of the Society are due as well to several public bodies as to individuals for presents lately received, and which will be found noted in this Volume. Alexander Mitchell, Esq. with his usual public spirit, has ornamented the Rooms of the Society with some excellent Prints, and made several valuable additions to the Library.

The Society desire it to be clearly understood, that, as a body, they are not responsible for any opinion or representation of facts contained in the following pages. They have endeavoured only to compress, into a form more concise, such communications as appeared to them too diffuse when received.

Adelphi, London,
Feb. 27, 1811.